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Anisotropic exchange in LiCu2 O2

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Abstract

© 2017 American Physical Society. We investigate the magnetic properties of the multiferroic quantum-spin system LiCu2O2 by electron spin resonance (ESR) measurements at X- and Q-band frequencies in a wide temperature range (TN1≤T≤300 K). The observed anisotropies of the g tensor and the ESR linewidth in untwinned single crystals result from the crystal-electric field and from local exchange geometries acting on the magnetic Cu2+ ions in the zigzag-ladder-like structure of LiCu2O2. Supported by a microscopic analysis of the exchange paths involved, we show that both the symmetric anisotropic exchange interaction and the antisymmetric Dzyaloshinskii-Moriya interaction provide the dominant spin-spin relaxation channels in this material.

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